

FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1

TABLE OF CONTENTS

INTRODUCTION	4
BACKGROUND INFORMATION	5
DESCRIPTION OF THE FACILITY	5
History	5
Collection System Status	5
Service Area.....	6
Existing Facility	6
Discharge Outfall	7
Residual Solids	7
PERMIT STATUS.....	8
SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT.....	9
WASTEWATER CHARACTERIZATION	9
SEPA COMPLIANCE.....	9
PROPOSED PERMIT LIMITATIONS.....	9
DESIGN CRITERIA	10
TECHNOLOGY-BASED EFFLUENT LIMITATIONS	10
SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS.....	12
Numerical Criteria for the Protection of Aquatic Life	12
Numerical Criteria for the Protection of Human Health.....	12
Narrative Criteria	12
Antidegradation	12
Critical Conditions	13
Mixing Zones.....	13
Description of the Receiving Water.....	13
Surface Water Quality Criteria	13
Consideration of Surface Water Quality-Based Limits for Numeric Criteria.....	14
Whole Effluent Toxicity	16
Human Health	17
Sediment Quality	18
GROUND WATER QUALITY LIMITATIONS.....	18
COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT ISSUED JUNE 27, 1990.....	18
MONITORING REQUIREMENTS.....	19
LAB ACCREDITATION	19
OTHER PERMIT CONDITIONS	19
REPORTING AND RECORDKEEPING	19
PREVENTION OF FACILITY OVERLOADING	19
OPERATION AND MAINTENANCE (O&M).....	20
RESIDUAL SOLIDS HANDLING.....	20
PRETREATMENT	20
SPILL PLAN	20
SANITARY SEWER OVERFLOW ELIMINATION PROGRAM.....	20
OUTFALL EVALUATION	21
GENERAL CONDITIONS	21

FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1

PERMIT ISSUANCE PROCEDURES	21
PERMIT MODIFICATIONS	21
RECOMMENDATION FOR PERMIT ISSUANCE	21
REFERENCES FOR TEXT AND APPENDICES	22
APPENDIX A--PUBLIC INVOLVEMENT INFORMATION	23
APPENDIX B--GLOSSARY	24
APPENDIX C--TECHNICAL CALCULATIONS	28
LAB ACCREDITATION	35
APPENDIX D--RESPONSE TO COMMENTS	39

INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES) of permits, which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the State of Washington on the basis of Chapter 90.48 Revised Code of Washington (RCW) which defines the Department of Ecology's (Department) authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the state include procedures for issuing permits [Chapter 173-220 Washington Administrative Code (WAC)], technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least 30 days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

<u>GENERAL INFORMATION</u>	
Applicant	City of Tacoma 2201 Portland Avenue Tacoma, Washington 98421
Facility Name and Address	City of Tacoma Central Wastewater Treatment Plant #1 2201 Portland Avenue Tacoma, Washington 98421
Type of Treatment	Pure Oxygen – Activated Sludge Secondary Treatment
Discharge Location	Commencement Bay, Puget Sound Latitude: 47° 16' 41.7" N Longitude: 122° 25' 09" W
Water Body ID Number	47122C4H1 WA-10-0010

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

HISTORY

The City of Tacoma's Central Wastewater Treatment Plant was originally constructed in 1951 and provided primary sewage treatment with a capacity of 13.5 million gallons per day (mgd) average dry weather flow (ADWF) with discharge to the Puyallup River. In 1957, the City began a program to separate out stormwater from the sanitary sewer and increased the capacity of the primary treatment plant from 13.5 mgd to 27 mgd ADWF.

Additional improvements to the primary plant occurred between 1979 and 1982. These upgrades increased the capacity of the treatment plant from 27 mgd to 38 mgd. The last major upgrade was constructed in 1989 when the central treatment plant was upgraded to a biological secondary treatment facility with the completion of a high purity oxygen activated sludge treatment system, secondary settling, and chlorination disinfection of the treated wastewater effluent. This upgrade also relocated the Puyallup River outfall to Commencement Bay via a 15,650 foot overland pipeline to a deep marine outfall and diffuser located between Sitcum and Blair waterways approximately 1,200 feet offshore at a depth of approximately 125 feet.

The City of Tacoma's Central Wastewater Treatment Facility has been designated as requiring a major permit by the United States EPA.

COLLECTION SYSTEM STATUS

Construction of the first community sewers began in 1880. These first sewers discharged to the tidewaters of Commencement Bay. From that time until 1928, collection systems constructed for sanitary sewage and stormwater were separate, interconnected only at the head of ravines or near the point of final disposal. Between 1928 and 1946, most collection system construction combined sanitary and stormwater, conveying it to Commencement Bay. Engineering studies conducted in 1946 prompted the City to maintain separate collection systems for storm and sanitary service. Since 1946, sanitary and storm sewer systems have been constructed separately.

Trunk lines to route sewage from the existing sewers, and a wastewater treatment plant to service central, southern, and eastern Tacoma were approved in 1944. Construction of the trunk sewers and wastewater treatment plant began in 1949 and 1950, respectively. The sewer system was established as a public utility in 1951, just prior to the completion of the Central Treatment Plant in early 1952.

With the completion of Tacoma's Central Wastewater Treatment Facility in 1952, excessive hydraulic loadings prompted the City to begin a storm/sanitary separation program in 1957. This effort to eliminate combined sewers and reduce infiltration and inflow was essentially completed in 1966. The Central Treatment Plant also underwent additional construction in 1963 to increase capacity.

Despite the work on the collection system and added capacity, the Central Treatment Plant was hydraulically overloaded during high flow events. Infiltration and inflow removal through a sewer system rehabilitation program is now a regular ongoing commitment. This program with a budget of \$3 million per year for the CTP service area will take approximately 75-100 years to work through the entire collection system. While inflow efforts have lowered peak flows somewhat, the I/I reduction benefits of ongoing sewer rehabilitation will only be evident in the long term.

*FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1*

Construction of a trunk sewer and associated collection system across the Tacoma Tideflats into Northeast Tacoma was completed in 1975, providing sanitary sewer service to virtually the entire Tideflats area.

SERVICE AREA

The Central Treatment Plant service area encompasses approximately 50 square miles (32,000 acres) and the political jurisdictions of Tacoma, Fife, Fircrest, Milton, Pierce County, and King County. The Central Treatment Plant provides wastewater service to (Northeast Tacoma, Port of Tacoma, Central Business District, North Central, Manitou, Fern Hill, and Southeast Tacoma) which are totally within the city limits of Tacoma. Service is also provided to the three outlying municipality service areas of Fircrest, Fife, and Milton who have their own sanitary collection systems which convey wastewater to the Tacoma Central Wastewater Treatment Plant. The Lakehaven Service area of King County and Pierce County service areas of Dash Point, Browns Point, Fife Heights, County Port, and South and North Pierce County also have collection systems tributary to the Central Treatment Plant.

EXISTING FACILITY

Raw wastewater enters the plant through two 48-inch and one 60-inch line and passes through two reciprocating rake-style mechanically-cleaned $\frac{3}{4}$ -inch bar screens into the influent wet well. Three 39 mgd dry-pit centrifugal pumps convey the wastewater to an abandoned comminutor channel to the two grit tanks located in the influent building. Plant influent flow is measured on the discharge pipe from the influent wet well with a 36-inch magnetic flow meter.

Both grit tanks are in operation at all times. Grit that is collected in the tanks is washed and discharged into a dumpster and hauled offsite for disposal. The grit tanks are 35 square feet x 4 feet deep with a maximum hydraulic capacity of 78 mgd each.

From the grit tanks flow continues on to the four primary settling tanks with a total surface settling area of 27,530 square feet. Typically only two primary settling tanks are in operation except during peak winter flow conditions.

Primary effluent is conveyed from the primary settling tanks to the high purity oxygen activated sludge process. There are four covered oxygenation tanks that continuously mix the primary effluent and return activated sludge. The oxygen is supplied to the tanks by a pressure swing adsorption (PSA) system that consists of two 30 ton/day capacity units that produce approximately 90 percent pure oxygen. A 20,000 gallon liquid oxygen backup storage tank is available in the event that more oxygen is needed or the PSA system is out of service. Each of the four oxygenation tanks is divided into four stages with a total volume of 4.1 million gallons. The process is typically operated with two tanks in service until plant flows reach 40 mgd then a third tank is brought online. The fourth tank is placed in service when plant flows approach 60 mgd. The oxygenation tanks are designed for a peak hydraulic flow of 78 mgd.

The mixed liquor from the oxygenation tanks flows into an open channel for distribution to six final clarifiers. Each circular clarifier is 116 feet in diameter has a side water depth of 12.75 feet with all six clarifiers having a total surface area of 63,410 square feet.

Chlorine disinfection is applied to the plant effluent at the final clarifier weirs and contact time is provided in the 60-inch diameter 15,650 feet long outfall line. To provide a 20 minute contact time at peak flow conditions 7,376 feet of outfall line is required.

The Central Treatment Plant biosolids treatment and handling program is a thermophilic dual-digestion aerobic/anaerobic process that produces a Class A Exceptional Quality Biosolids.

*FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1*

The Central Treatment Plant treats mainly domestic sewage. The residential population currently served is estimated to be 153,894. Flow monitoring by City staff show that industrial and commercial flows to the central treatment plant are equivalent to approximately 35 percent of the residential flow. The industrial and commercial discharges to the wastewater system represent an equivalent population of 53,863 people for a total equivalent population served at the CTP of 207,757.

There are 17 non-categorical significant industrial users and 20 categorical industrial users discharging to the Central Treatment Plant. The City of Tacoma Sewer Utility has an industrial pretreatment program which regulates the discharges from these industries as well as those within the Tacoma North End WWTF service area.

The Central Wastewater Treatment Facility is a Class IV facility and is staffed 24 hours a day by a Class IV operator. The facility has eight operators which operate on 12 hour shifts.

DISCHARGE OUTFALL

Secondary treated and disinfected effluent is pumped to Commencement Bay via a 15,650-foot overland pipeline to a deep marine outfall and diffuser located between Sitcum and Blair waterways approximately 1,200 feet offshore at a depth of approximately 125 feet. The diffuser has 30 cylindrical risers spaced 10 feet apart. The risers vary in length from 0 to 9 feet above the 31 inch high riser pipes. Each riser has a single discharge port oriented perpendicular to the axis of the diffuser line. Alternate ports face opposite directions.

RESIDUAL SOLIDS

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the primary and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum, and screenings are drained and disposed of as solid waste at the local landfill.

Waste activated sludge is pumped to the dissolved air floatation thickeners for thickening and then heated with solids from the anaerobic digesters through sludge-to-sludge tube type heat exchangers. Primary solids are heated by two sludge-to-water spiral heat exchangers using methane gas from the anaerobic digesters to heat the water.

The mixed solids then enter the top of the high purity oxygen aerobic reactors. Digested solids are withdrawn from the bottom of the aerobic digesters and flow by gravity to the anaerobic digesters. The anaerobic digesters operate in series. Solids from the anaerobic digesters are pumped to the belt filter presses for dewatering. The dewatered biosolids are then used as the main ingredient in TAGRO™ mulch, TAGRO™ potting soil, and TAGRO™ mix, a natural organic soil conditioner mixture of biosolids, sand, and sawdust that is sold to the public. TAGRO™, liquid, 5-8 percent solids, is hauled by tanker and applied to various approved sites including areas such as pastures, cropland, and forestland.

PROPOSED UPGRADES

In March 2002 the City of Tacoma submitted a facility plan for improvements to the Central Treatment Plant to provide capacity for a re-rated design maximum monthly flow of 60 mgd and a design peak flow of 150 mgd.

The proposed upgrades would result in the influent screens, influent pump station, and grit tanks being upgraded to a minimum peak hourly capacity of 150 mgd, and a new peak wet weather flow process installed to treat wet weather related peak flows in excess of approximately 75 mgd. The primary settling

*FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1*

tanks and biological treatment process would remain at their current hydraulic capacity of approximately 88 mgd.

All flows up to 150 mgd would flow through the influent screens, influent pump station, and grit tanks. Flows up to 75 mgd would continue to flow through the existing primary settling tanks and the biological treatment process. Once flows exceeded 75 mgd, the ballasted sedimentation tanks would be placed in service. As influent flows increase above 80 mgd a constant flow of 75 mgd would be treated in the existing secondary treatment process, and the excess flow would be treated by the ballasted sedimentation process.

When ballasted sedimentation is in operation, the flow from the existing final clarifiers would be pumped via the existing effluent pump station to the new effluent pump station and blended with disinfected flow from the ballasted sedimentation process and conveyed through the existing outfall to commencement bay.

Since a portion of the flow during these peak flow events will only receive enhanced primary treatment with disinfection, additional monitoring will be required while flow blending is occurring to ensure the blended flow is within permit limits and does not cause toxicity problems.

For each flow blending event a minimum of three grab samples are required for fecal coliforms, pH, total residual chlorine, total ammonia, and dissolved oxygen from the final effluent; and a minimum of three grab samples for BOD₅ and TSS from the effluent of the peak flow treatment system. Twenty-four- (24) hour flow weighted composite samples are also required for BOD₅ and TSS from the plant influent and final effluent during each flow blending event.

The final flow blended effluent will also be tested once per year for priority pollutant metals and acute and chronic toxicity in years in which flow blending occurs to ensure that the blended flow is not causing toxicity problems.

The influent and effluent composite samplers will be kept on whenever there is the possibility that a peak flow event could occur. For those days when sample collection would not normally take place and a flow blending event did not occur the composite sample may be discarded.

DESIGN BUILD LOAN

Tacoma is participating in a pilot rule project in order to apply for loan monies from the Department under a design/build concept for the proposed upgrades described above. Tacoma anticipates a considerable increase in the final project quality as well as possible cost and time savings using this alternate procurement procedure. Design/build allows individual components of projects to be designed separately as the overall project progresses. Engineering review described by WAC 173-240 Sections 070, 075, 080, and 180 has been delegated to the City of Tacoma to eliminate the need for the Department approval. A loan agreement between the Department and the City of Tacoma will describe how monies from the Department will be released during the project.

PERMIT STATUS

The previous permit for this facility was issued on June 27, 1990. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS), pH, Fecal Coliform bacteria, and Total Recoverable Copper.

An application for permit renewal was submitted to the Department on December 29, 1999, and accepted by the Department on November 14, 2000.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

During the history of the previous permit, the Permittee has remained in compliance, based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department.

WASTEWATER CHARACTERIZATION

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports. The effluent is characterized as follows:

Table 1: Wastewater Characterization

<u>Parameter</u>	<u>Concentration</u>
Flow	19 MGD ADWF – 31 MGD AFMM
BOD ₅	18 mg/L annual average – 25 mg/L max monthly average
TSS	22 mg/L annual average – 27 mg/L maximum monthly average
pH	6 s.u. – 7.7 s.u.
Fecal Coliform Bacteria	86 cfu/100mL 90 th %-tile monthly geomean
Total Recoverable Copper	35.3 ug/L 90 th %-tile maximum daily

SEPA COMPLIANCE

The City of Tacoma has completed the State Environmental Policy Act (SEPA) process for the March, 2002, facility plan which outlines the proposed upgrades. The City has also completed the State Environmental Review Process in order to apply for State Revolving Fund monies from the Department.

PROPOSED PERMIT LIMITATIONS

Federal and state regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the state of Washington were determined and included in this permit. The Department does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The existing design criteria for this treatment facility are taken from the 1985 Facilities Planning Amendment prepared by Parametrix, Inc., and the design quantities after the upgrades were obtained from the March 2002, Central Treatment Plant comprehensive plan prepared by Parametrix, Inc., and are as follows:

Table 2: Design Standards for the Tacoma Central #1 WWTP.

Parameter	Current Design Quantity	Design Quantity After Upgrades
Average Annual Flow		40 MGD
Monthly average flow (max. month)		60 MGD
Monthly average dry weather flow	28 MGD	
Monthly average wet weather flow	38 MGD	
Dry season peak day flow	53 MGD	
Wet season peak day flow	78 MGD	150 MGD
BOD ₅ influent loading	127,000 lbs./day	127,000 lbs./day
TSS influent loading	93,400 lbs./day	114,000 lbs./day
Design population equivalent	207,757	338,000

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, fecal coliform, BOD₅, and TSS taken from Chapter 173-221 WAC are:

Table 3: Technology-based Limits.

Parameter	Limit
pH:	shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD ₅ (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

Parameter	Limit
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

The Tacoma Central Wastewater Treatment plant currently receives trucked solids from the Tacoma North End Treatment plant and on occasion from other NPDES permitted facilities. These loadings are discharged in a manhole just upstream of the CTP headworks and are then included in the influent sample for the CTP. Section 405A of the Clean Water Act prohibits the reintroduction of sewerage sludge to surface waters after being removed at a POTW.

The Department finds that the intent of the prohibition on reintroducing sewerage sludge is met as long as loadings received from other NPDES permitted facilities are accounted for and subtracted from the headworks loading at the CTP. Therefore, no additional loadings (BOD and TSS) are allowed to be discharged from the CTP as a result of introduced loadings from other NPDES permitted facilities.

Waste received from septage haulers and other non NPDES permitted facilities may be introduced in such a way as to be counted as headworks loading. Waste received from other NPDES facilities shall either be introduced in such a way as not to be included in the influent sample or accounted for and subtracted from the headworks loading at the CTP.

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Effluent Loadings Before Upgrade

BOD₅ monthly effluent mass loadings (lbs/day) were calculated as the maximum monthly design flow (38 MGD) x monthly concentration limit (30 mg/L) x 8.34 (conversion factor) = mass limit 9,508 lbs/day.

The BOD₅ weekly average effluent mass loading is calculated as 1.5 x monthly loading = 14,261 lbs/day.

TSS monthly effluent mass loadings (lbs/day) were calculated as the maximum monthly design flow (38 MGD) x monthly concentration limit (30 mg/L) x 8.34 (conversion factor) = mass limit 9,508 lbs/day.

The TSS weekly average effluent mass loading is calculated as 1.5 x monthly loading = 14,261 lbs/day.

Effluent Loadings After Upgrade

BOD₅ monthly effluent mass loadings (lbs/day) were calculated as the maximum monthly design flow (60 MGD) x monthly concentration limit (30 mg/L) x 8.34 (conversion factor) = mass limit 15,012 lbs/day.

The weekly average effluent mass loading is calculated as 1.5 x monthly loading = 22,518 lbs/day.

TSS monthly effluent mass loadings (lbs/day) were calculated as the maximum monthly design flow (60 MGD) x monthly concentration limit (30 mg/L) x 8.34 (conversion factor) = mass limit 15,012 lbs/day.

The weekly average effluent mass loading is calculated as 1.5 x monthly loading = 22,518 lbs/day.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the state of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the state of Washington.

ANTIDEGRADATION

The state of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

*FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1*

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

MIXING ZONES

The Water Quality Standards allow the Department to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

DESCRIPTION OF THE RECEIVING WATER

The Tacoma Central Wastewater Treatment Facility discharges to inner Commencement Bay which is designated as a Class B (good) receiving water in the vicinity of the outfall under WAC 173-201A-140(4). Commencement Bay changes to a Class A (excellent) receiving water less than ¼ mile west to a line bearing 225° through the Hylebos waterway light and east of a line bearing 258° through Browns Point. Approximately 3 miles from the CTP outfall past Browns Point, the classification changes to a Class AA (extraordinary) receiving water.

Other nearby point source outfalls include the Tacoma North End Treatment Plant outfall diffuser located approximately 3.1 miles northwest of the Central Treatment Plant outfall diffuser. There are several industrial facilities that discharge into Commencement Bay and the associated Waterways as well as facilities located in the Nalley Valley who discharge into the stormwater system that discharges into the head of City Waterway. The old Asarco smelter was located along the north end of Ruston Way just south of Point Defiance and is now a federal clean-up site.

Characteristic uses of Class B waters include the following: water supply (industrial, agricultural); stock watering; fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; secondary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall meet or exceed the requirements for most uses.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	5 mg/L minimum
Temperature	19 degrees Celsius maximum or incremental increases above background

*FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1*

pH	7 to 8.5 standard units
Turbidity	less than 10 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of the PLUMES dilution model. The dilution factors listed below were taken from the Abbreviated Engineering Report for Outfall Diffuser Enhancements, for the Tacoma Central Wastewater Treatment Facility, prepared by Parametrix, Inc., 1997.

	Current Dilution Factors		Dilution Factors After Upgrade	
	Acute	Chronic	Acute	Chronic
Aquatic Life	25	148	22	145
Human Health, Carcinogen		179		186
Human Health, Non-carcinogen		154		145

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

Ambient data in the vicinity of the Tacoma Central Wastewater Treatment Facility outfall was taken from marine water quality monitoring station CMB003 south of Browns Point in central Commencement Bay, from 1990 to 2000. The ambient background data used for this permit includes the following:

Parameter	Value used
Temperature (90 th percentile)	13.2°C
pH	7.2 s.u – 8.7 s.u.
Dissolved Oxygen (10 th percentile)	6.3 mg/L

*FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1*

Total Ammonia-N (90 th percentile)	0.908 ug/L
Fecal Coliform (90 th percentile)	100 cfu/100 mL
Salinity (10 th percentile)	22.4 ppt
All Metals	See Appendix C

BOD₅--Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, the technology-based effluent limitation for BOD₅ was placed in the permit.

The impact of BOD on the receiving water was modeled using the spreadsheet IDOD2 for dissolved oxygen, at critical condition. The calculations used to determine dissolved oxygen impacts are shown in Appendix C. This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limitations will be protective of dissolved oxygen criteria in the receiving water.

Temperature--The impact of the discharge on the temperature of the receiving water was modeled by simple mixing analysis at critical condition. The receiving water temperature at the critical condition is 13.2°C and the estimated effluent temperature from influent data is 22°C. The predicted resultant temperature at the boundary of the chronic mixing zone is 13.3°C and the incremental rise is 0.06°C.

Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, no effluent limitation for temperature was placed in the proposed permit.

pH--Because of the high buffering capacity of marine water, compliance with the technology-based limits of 6 to 9 will assure compliance with the Water Quality Standards for Surface Waters.

Fecal coliform--The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 organisms per 100 mL and an acute dilution factor of 25, and the technology-based limit of 200 organisms per 100 mL and a chronic dilution factor of 148. Ambient fecal coliform data were obtained from water quality monitoring station CMB003.

Under critical conditions there was a prediction of a violation of the fecal coliform criterion for the receiving water with the technology-based limits. Therefore, the water quality standard for fecal coliforms of 100 organisms/100 ml as a monthly geometric mean will be imposed instead of the technology-based limitation.

It may be possible that the ambient monitoring station does not closely represent the conditions in the vicinity of the outfall. The permittee has the option of conducting a receiving water study in the vicinity of the outfall to show that ambient conditions do not have the potential to violate the fecal coliform standard at the edge of the mixing zones. If the permittee chooses to conduct a receiving water study for fecal coliform, a quality assurance project plan will need to be submitted to the Department for approval prior to conducting the study.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not

*FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1*

exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: chlorine, ammonia, and heavy metals. A reasonable potential analysis (See Appendix C) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit.

The determination of the reasonable potential for chlorine, ammonia, and heavy metals to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix C) at the critical condition. The critical condition in this case occurs with low salinity, high ambient temperature and pH. The parameters used in the critical condition modeling are as follows: acute dilution factor 25, chronic dilution factor 148, receiving water temperature 13.2°C, receiving water pH 8.1 s.u., and receiving water salinity of 22.4 ppt. The background levels for each pollutant may be found in the reasonable potential table in Appendix C. Ambient metals concentrations were determined from a Department study (Johnson, 1999) and a Battelle study (Crecelius, 1998).

Water quality criteria for metals in Chapter 173-201A WAC are based on the dissolved fraction of the metal.

The Permittee may provide data clearly demonstrating the seasonal partitioning of the dissolved metal in the ambient water in relation to an effluent discharge. Metals criteria may be adjusted on a site-specific basis when data is available clearly demonstrating the seasonal partitioning in the ambient water in relation to an effluent discharge.

Metals criteria may also be adjusted using the water effects ratio approach established by USEPA, as generally guided by the procedures in USEPA Water Quality Standards Handbook, December 1983, as supplemented or replaced.

Effluent limits were derived for chlorine, which was determined to have a reasonable potential to cause a violation of the Water Quality Standards. Effluent limits were calculated using methods from EPA, 1991 as shown in Appendix C.

The resultant effluent limits are as follows:

Parameter	Average Monthly	Maximum Daily
Total Residual Chlorine	0.124 mg/L	0.325 mg/L

WHOLE EFFLUENT TOXICITY

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC₅₀, EC₅₀, IC₂₅, etc. All accredited labs have been provided the most recent version of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Ecology Publications Distribution Center (360) 407-7472 for a copy. The Department recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

Acute toxicity was measured during effluent characterization in the previous permit term. Acute toxicity was found to be at levels that, in accordance with WAC 173-205-050(2)(a), have a reasonable potential to cause receiving water toxicity. An acute toxicity limit is therefore required. The acute toxicity limit is no statistically significant difference in test organism survival between the acute critical effluent concentration (ACEC), 4 percent of the effluent, and the control.

The acute toxicity limit is set relative to the zone of acute criteria exceedance (acute mixing zone) established in accordance with WAC 173-201A-100. The acute critical effluent concentration (ACEC) is the concentration of effluent existing at the boundary of the acute mixing zone during critical conditions.

Monitoring for compliance with an acute toxicity limit is accomplished by conducting an acute toxicity test using a sample of effluent diluted to equal the ACEC and comparing test organism survival in the ACEC to survival in nontoxic control water. The Permittee is in compliance with the acute toxicity limit if there is no statistically significant difference in test organism survival between the ACEC and the control.

Chronic toxicity was measured in the previous permit term. The results of this WET testing cannot be used to characterize effluent toxicity or make the regulatory determination required in Chapter 173-205 WAC. The chronic WET testing done by the Permittee is 10 years old and not of good quality. Six MSDp values are close to 40 percent or higher indicating that the chronic statistical power standard was not met. See WAC 173-205-050(2)(a)(iii)(A). Even with the low statistical sensitivity in the tests, significant toxicity was seen as low as 12.5 percent effluent. The chronic testing required by WAC 173-205-030(8) was not done and there is no current information for use in making the determination required in WAC 173-205-060(3)(a). A new effluent characterization for chronic WET makes sense in this permit in order to provide a current assessment of effluent chronic toxicity. In accordance with WAC 173-205-030(5)(b), the Permittee is required to conduct an effluent characterization for chronic whole effluent toxicity.

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the applicant's discharge does not contain chemicals of concern based on existing data or knowledge. The discharge will be re-evaluated for impacts to human health at the next permit reissuance.

*FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1*

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has been unable to determine at this time the potential for this discharge to cause a violation of sediment quality standards. If the Department determines in the future that there is a potential for violation of the Sediment Quality Standards, an order will be issued to require the Permittee to demonstrate that either the point of discharge is not an area of deposition or, if the point of discharge is a depositional area, that there is not an accumulation of toxics in the sediments.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground and therefore no limitations are required based on potential effects to ground water.

COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT ISSUED JUNE 27, 1990

Existing Limits		Proposed Limits	
BOD ₅	30 mg/L 9,508 lbs/day 45 mg/L 14,261 lbs/day	BOD ₅	30 mg/L 15,012 lbs/day 45 mg/L 22,518 lbs/day
TSS	30 mg/L 9,508 lbs/day 45 mg/L 14,261 lbs/day	TSS	30 mg/L 15,012 lbs/day 45 mg/L 22,518 lbs/day
F. Coliform 200/100 mL - 400/100 mL		F. Coliform 100/100 mL - 200/100 mL	
pH 6.0 - 9.0		pH 6.0 - 9.0	
		Chlorine	124 ug/L 325 ug/L
Total Recoverable Copper	272 ug/L 108 ug/L		
		No acute toxicity detected in a test concentration representing the acute critical effluent concentration (ACEC).	
		No chronic toxicity detected in a test concentration representing the chronic critical effluent concentration (CCEC). If any of the tests conducted for effluent characterization shows a significant difference between the control and the ACEC.	

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

Reduced monitoring frequencies are allowed for demonstrated good performance and are based on the ratio of the long term effluent average to the average monthly limit. The permit writer's manual recommends that for an activated sludge plant with a flow greater than 5 MGD that BOD₅ and TSS be monitored at least 5/week and Fecal Coliforms be monitored on a daily basis. Total Copper and Total Ammonia are currently monitored 3/week. The ratio of the LTA to AML of the Tacoma Central WWTF effluent for the following parameters is: BOD₅ 59 percent; TSS 71 percent; Fecal Coliforms 81 percent, Total Copper 23 percent, and Total Ammonia 18 percent. Based on these ratios of LTA to AML the permit writers manual allows a reduction for BOD₅ from 5/week down to 3/week, TSS from 5/week down to 4/week, Fecal Coliform testing will go from 5/week to 7/week in accordance with the Permit Writer's Manual, Total Recoverable Copper and Total Ammonia will go from 3/week down to 1/week, per Table XIII-1A1 in the permit writers manual. These reductions in monitoring frequencies will be incorporated into the proposed permit.

Monitoring of biosolids quantity and quality is necessary to determine the appropriate uses of the biosolids. Biosolids monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of the Department's *Permit Writer's Manual* (July 1994) for activated sludge secondary treatment.

As a pretreatment POTW, the City of Tacoma is required to have influent, final effluent, and biosolids from the Central and North End Treatment plants sampled for toxic pollutants in order to characterize the industrial input. Sampling is also done to determine if pollutants interfere with the treatment process or pass through the plant to the biosolids or the receiving water. The monitoring data will be used by the City of Tacoma to develop local limits which commercial and industrial users must meet.

LAB ACCREDITATION

A list of parameters the laboratory at the Tacoma Central WWTF is accredited for is tabulated in Appendix C.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S3 are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit requirement S.4 to plan expansions or modifications before existing capacity

*FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1*

is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4 restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains Condition S.5 as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems the Permittee is required in permit Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503. The disposal of other solid waste is under the jurisdiction of the Pierce County Health Department.

Requirements for monitoring sewage sludge and recordkeeping are included in this permit. This information will be used by the Department to develop or update local limits and is also required under 40 CFR 503.

PRETREATMENT

To provide more direct and effective control of pollutants discharged, the City of Tacoma has been delegated permitting, monitoring, and enforcement authority for industrial users discharging to their treatment system. The Department oversees the delegated Industrial Pretreatment Program to assure compliance with federal pretreatment regulations (40 CFR Part 403) and categorical standards and state regulations (Chapter 90.48 RCW and Chapter 173-216 WAC).

The permit conditions reflect the requirements of the Federal Pretreatment Program as found in volume 40 of the Code of Federal Regulations part 403, and the State's Waste Discharge permit system as codified in Chapter 173-216 of Washington Administrative Code.

SPILL PLAN

The Department has determined that the Permittee stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. The Department has the authority to require the Permittee to develop best management plans to prevent this accidental release under section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080.

SANITARY SEWER OVERFLOW ELIMINATION PROGRAM

The Permittee is required to continue their sanitary sewer overflow elimination program to replace and rehabilitate their sewer collection system with the goal of: eliminating raw sewage overflows or bypasses; removing all excessive infiltration and inflow; eliminating bottlenecks in the collection system that are preventing the conveyance of flow to the treatment plant; routinely and consistently meet discharge permit limits; and having all water collected in the collection system conveyed to the treatment plant and treated to secondary standards prior to discharge. The Permittee will submit an annual report to the Department describing the work that has been done during the previous year to achieve these goals.

OUTFALL EVALUATION

Proposed permit condition S.11 requires the Permittee to conduct an outfall inspection and submit a report detailing the findings of that inspection. The purpose of the inspection is to determine the condition of the discharge pipe and diffusers and to determine if sediment is accumulating in the vicinity of the outfall.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for five years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

- 1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.
- 1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.
- 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.
- 1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.
- 1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Metcalf and Eddy.

- 1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

Tsivoglou, E.C., and J.R. Wallace.

- 1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

- 1994. Permit Writer's Manual. Publication Number 92-109

Water Pollution Control Federation.

- 1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

- 1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(E2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on July 13, 2003, and July 20, 2003, in the *Tacoma News Tribune* to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on March 9, 2004, in the *Tacoma News Tribune* to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Administrator
Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the 30-day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least 30 days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within 30 days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, (360) 407-6275, or by writing to the address listed above.

This permit and fact sheet were written by Glenn Pieritz.

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART-- An acronym for "all known, available, and reasonable methods of prevention, control, and treatment".

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD₅--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

CBOD₅ -- The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celcius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD₅ is given in 40 CFR Part 136.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring --Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial User-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

Pass through -- A discharge which exits the POTW into waters of the--State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)--

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.ecy.wa.gov>.

FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1

Dissolved oxygen concentration following initial dilution.

References: EPA/600/6-85/002b and EPA/430/9-82-011

Based on Lotus File IDOD2.WK1 Revised 19-Oct-93

Note: Tacoma #1

INPUT	
1. Dilution Factor at Mixing Zone Boundary:	148
2. Ambient Dissolved Oxygen Concentration (mg/L):	6.3
3. Effluent Dissolved Oxygen Concentration (mg/L):	4
4. Effluent Immediate Dissolved Oxygen Demand (mg/L):	0
OUTPUT	
Dissolved Oxygen at Mixing Zone Boundary (mg/L):	6.28

FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1

Point source effluent temperature limits

Reference: WAC 173-201A-030(1),(2),(3), and (4)

for freshwater and marine water Class AA, A, B, and C

Notes: Tacoma #1

INPUT	
1. Dilution factor at the mixing zone boundary (see note 1): (from rivplum5 or other mixing zone model, greater than or equal to 1)	148
2. Upstream or background temperature, 90th percentile (degrees C):	13.2
3. Effluent temperature, 90th percentile (degrees C):	22
3. Freshwater or marine water (fresh or marine):	marine
4. Water quality classification (AA, A, B, or C):	B
OUTPUT	
water quality standard (degrees C)	19
"t" numerator constant	16
"t" denominator constant	0
maximum temperature increase if the background temperature is less than the standard (degrees C):	1.21
maximum temperature increase if the natural temperature is greater than or equal to the standard (degrees C):	0.30
Maximum allowable temperature increase at the mixing zone boundary (degrees C, see note 2):	1.21
Maximum allowable effluent temperature (degrees C) (see note 3):	33.0
Temperature increase at the mixing zone boundary using simple mixing (degrees C):	0.06
Temperature at the mixing zone boundary using simple mixing (degrees C):	13.3

Notes:

(1) The dilution factor is the reciprocal of the volumetric fraction of effluent at the edge of the mixing zone.

Applicable mixing zones are regulated under WAC 173-201A-100.

(2) Based on the conservative assumption that the natural condition would be greater than the standard if the available data show that the upstream or background temperature is at or above the standard.

(3) Based on the conservative assumption that the maximum allowable effluent temperature may not exceed the instantaneous lethal limit of 33 degrees C.

Simple Mixing
for Fecal Coliform Bacteria

Simple Mixing Analysis using Tech Based Limits	
Effluent FC Concentration =	400
Acute Dilution Factor =	25
Ambient FC Concentration =	130
Acute FC Concentration =	141
Effluent FC Concentration =	200
Chronic Dilution Factor =	148
Ambient FC Concentration =	100
Chronic FC Concentration =	101

Simple Mixing Analysis using Existing Effluent Values	
Effluent FC Concentration =	351
Acute Dilution Factor =	25
Ambient FC Concentration =	130
Acute FC Concentration =	139
Effluent FC Concentration =	138
Chronic Dilution Factor =	148
Ambient FC Concentration =	100
Chronic FC Concentration =	100

The background fecal coliform concentration exceeded the water quality standards of 100cfu /100mL at station CMB003 (95th percentile = 130 cfu/100 mL, 90th percentile 100 cfu/100 mL). Therefore any analysis would show a reasonable potential to violate standards.

**Determining the Requirement for Permit Limits Through a
Reasonable Potential Determination to Violate Standards
at the Edge of the Mixing Zone.
Based on EPA/505/2-90-001**

Notes: Tacoma #1 Total Residual Chlorine

INPUT	
Confidence Level and Probability Basis:	0.95
Coefficient of Variation for the Effluent Concentration (CV) (0.6 or a calculated CV if there are more than 10 data points):	0.6
Number of Effluent Samples or Data Points (ND):	1242
Highest Effluent Concentration or Value (HV):	1430
Dilution Factors (1/{Effluent Volume Fraction}) or plumes model	
Acute Receiving Water Dilution Factor:	25
Chronic Receiving Water Dilution Factor:	148
Water Quality Standards (Concentration)	
Acute (one-hour) Criteria:	13
Chronic (n-day) Criteria:	7.5
Upstream Receiving Water Concentration:	
Upstream Concentration for Acute Condition (7Q10): 95th%-tile	0
Upstream Concentration for Chronic Condition (7Q10): 90th%-tile	0
OUTPUT	
Percentile Represented by the Highest Concentration in Data Set	
$(p_n) = (1 - \text{confidence level})^{1/ND}$	0.9976
Normal Distribution Value for 95th Percentile	1.6449
Normal Distribution Value for 100th Percentile	2.8189
$\sigma^2 = \ln(CV^2 + 1)$	0.3075
$C95 = \exp(1.645\sigma - 0.5\sigma^2)$	2.1348
$C100 = \exp(2.819\sigma - 0.5\sigma^2)$	4.0935
Reasonable Potential Multiplier = $C95/C100$	0.5215
Maximum Expected Concentration of Pollutant in Effluent (MEC):	745.7408
Acute - Concentration of Pollutant at the Edge of the Mixing Zone (CP):	29.8296
Chronic - Concentration of Pollutant at the Edge of the Mixing Zone (CP):	5.0388
Reasonable Potential to Violate Acute Criteria at the Edge of the Mixing Zone (RP):	YES
Reasonable Potential to Violate Chronic Criteria at the Edge of the Mixing Zone (RP):	NO

FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1

Water Quality-Based Permit Limits for Acute and Chronic Criteria.

(based on EPA/505/2-90-001 Box 5-2).

Based on Lotus File WQBP2.WK1 Revised 19-Oct-93

Notes: Tacoma #1 Total Residual Chlorine

INPUT	
1. Water Quality Standards (Concentration)	
Acute (one-hour) Criteria:	13
Chronic (n-day) Criteria:	7.5
2. Upstream Receiving Water Concentration	
Upstream Concentration for Acute Condition (7Q10): 95th%-tile	0.0
Upstream Concentration for Chronic Condition (7Q10): 90th%-tile	0.0
3. Dilution Factors ($1/\{\text{Effluent Volume Fraction}\}$) or Plumes Model	
Acute Receiving Water Dilution Factor:	25
Chronic Receiving Water Dilution Factor:	148
4. Coefficient of Variation for Effluent Concentration	
(0.6 or a calculated CV if there are more than 10 data points):	0.6
5. Number of days (n1) for chronic average	
(usually four or seven; four is recommended):	4
6. Number of samples (n2) required per month for monitoring:	30
OUTPUT	
1. Z Statistics	
LTA Derivation (99%tile):	2.326
Daily Maximum Permit Limit (99%tile):	2.326
Monthly Average Permit Limit (95%tile):	1.645
2. Calculated Waste Load Allocations (WLA's)	
Acute (one-hour) WLA:	325.000
Chronic (n1-day) WLA:	1110.000
3. Derivation of LTAs using April 1990 TSD (Box 5-2 Step 2 & 3)	
Sigma ² :	0.3075
Sigma ² -n1:	0.0862
LTA for Acute (1-hour) WLA:	104.332
LTA for Chronic (n1-day) WLA:	585.391
Most Limiting LTA (minimum of acute and chronic):	104.332
4. Derivation of Permit Limits From Limiting LTA (Box 5-2 Step 4)	
Sigma ² -n2:	0.0119
Daily Maximum Permit Limit:	325
Monthly Average Permit Limit:	124

FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1

Determining the Requirement for Permit Limits Through a Reasonable Potential Determination to Violate Standards at the Edge of the Mixing Zone.

Based on EPA/505/2-90-001

Notes: Tacoma #1 Metals Workbook

INPUT											
	Arsenic	Cadmium	Cr Hex	Cr Tri	Copper	Lead	Mercury	Nickel	Selenium	Silver	Zinc
Confidence Level and Probability Basis:	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Coefficient of Variation for the Effluent Concentration (CV) (0.6 or a calculated CV if there are more than 10 data points):	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Number of Effluent Samples or Data Points (ND):	34	34	20	34	534	34	14	34	34	34	34
Highest Dissolved Effluent Concentration or Value (HV):	21.497	0.0764	6.059	2.1829	77.19	3.071	0.2241	4.0089	1.3944	2.988	54.365
Dilution Factors (1/{Effluent Volume Fraction}) or plumes model											
Acute Receiving Water Dilution Factor:	25	25	25	25	25	25	25	25	25	25	25
Chronic Receiving Water Dilution Factor:	148	148	148	148	148	148	148	148	148	148	148
Water Quality Standards (Concentration)											
Acute (one-hour) Dissolved Criteria:	69	42	1,100	---	4.8	210	1.8	74	290	1.9	90
Chronic (n-day) Dissolved Criteria:	36	9.3	50	---	3.1	8.1	0.025	8.2	71	---	81
Upstream Receiving Water Concentration:											
Upstream Dissolved Concentration for Acute Condition (7Q10):	0.981	0.0613	0.15	0.15	1.003	0.0202	0.0005	0.4395	0.0871	0	3.65
Upstream Dissolved Concentration for Chronic Condition (7Q10):	0.981	0.0613	0.15	0.15	1.003	0.0202	0.0005	0.4395	0.0871	0	3.65
OUTPUT											
Percentile Represented by the Highest Concentration in Data Set (p _n) = (1 - confidence level) ^{1/ND}	0.916	0.916	0.861	0.916	0.994	0.916	0.807	0.916	0.916	0.916	0.916
Normal Distribution Value for 95th Percentile	1.645	1.645	1.645	1.645	1.645	1.645	1.645	1.645	1.645	1.645	1.645
Normal Distribution Value for XXth Percentile	1.376	1.376	1.084	1.376	2.537	1.376	0.868	1.376	1.376	1.376	1.376
s ² = ln(CV ² +1)	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307
C95 = exp(1.645Sigma -0.5Sigma^2)	2.135	2.135	2.135	2.135	2.135	2.135	2.135	2.135	2.135	2.135	2.135
CXX = exp(XX Sigma -0.5Sigma^2)	1.840	1.840	1.564	1.840	3.501	1.840	1.388	1.840	1.840	1.840	1.840
Reasonable Potential Multiplier = C95/CXX	1.2	1.2	1.4	1.2	0.6	1.2	1.5	1.2	1.2	1.2	1.2
Maximum Expected Concentration of Pollutant in Effluent (MEC):	24.95	0.089	8.268	2.533	47.07	3.564	0.345	4.652	1.6182	3.467	63.09
Acute - Concentration of Pollutant at the Edge of the Mixing Zone (CP):	1.940	0.062	0.475	0.245	2.846	0.162	0.014	0.608	0.1483	0.139	6.03
Chronic - Concentration of Pollutant at the Edge of the Mixing Zone (CP):	1.143	0.061	0.205	0.166	1.314	0.044	0.003	0.468	0.0974	0.023	4.05
Reasonable Potential to Violate Acute Criteria at the Edge of the Mixing Zone (RP):	NO RP	NO RP	NO RP	---	NO RP	NO RP	NO RP	NO RP	NO RP	NO RP	NO RP
Reasonable Potential to Violate Chronic Criteria at the Edge of the Mixing Zone (RP):	NO RP	NO RP	NO RP	---	NO RP	NO RP	NO RP	NO RP	NO RP	---	NO RP

FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1

LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at the Tacoma Central WWTF is accredited for the following parameters:

Accredited parameters:

CHEM I (GENERAL CHEM)			
parameter name	method	reference	matrix *
Acidity	2310 B(4c)	SM	N
Alkalinity, Total	2320 B(4a)	SM	N
Alkalinity, Total	310.1	EPA	N
Ammonia	350.2(7.4.2)	EPA	N
Biochemical Oxygen Demand, BOD/CBOD	405.1	EPA	N
Biochemical Oxygen Demand, BOD/CBOD	5210 B	SM	N
Chemical Oxygen Demand (COD)	410.4(7.3)	EPA	N
Chemical Oxygen Demand (COD)	5220 C	SM	N
Chemical Oxygen Demand (COD)	5220 D	SM	N
Chloride	325.3	EPA	N
Chlorine Residual, Total	330.1	EPA	N
Chromium, Hexavalent	3500-Cr B	SM	N
Cyanide, Total	335.2(8.7)	EPA	N
Dissolved Oxygen	360.1	EPA	N
Dissolved Oxygen	360.2	EPA	N
Dissolved Oxygen	4500-O C	SM	N
Dissolved Oxygen	4500-O D	SM	N
Hexane Extractable Material	1664	EPA	N
Nitrate	353.2	EPA	N
Nitrate + Nitrite	353.2	EPA	N
Nitrite	353.2	EPA	N
Nitrogen, Total Kjeldahl	351.2	EPA	N
Orthophosphate	365.1	EPA	N
pH	150.1	EPA	N
pH	4500-H	SM	N
Phenolics, Total Recoverable	420.2	EPA	N
Phosphorus, Total	365.1	EPA	N
Phosphorus, Total	365.4	EPA	N
Salinity	120.1	EPA	N
Salinity	2520 B	SM	N
Silica, Dissolved	370.1	EPA	N
Solids, Total	160.3	EPA	N
Solids, Total	2540 B	SM	N
Solids, Total Dissolved	160.1	EPA	N

FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1

Solids, Total Dissolved	2540 C	SM	N
Solids, Total Suspended	160.2	EPA	N
Solids, Total Suspended	2540 D	SM	N
Solids, Total Volatile	160.4	EPA	N
Solids, Total Volatile	2540 E	SM	N
Specific Conductance	120.1	EPA	N
Specific Conductance	2510 B	SM	N
Sulfate	375.4	EPA	N
Sulfate	4500-SO4 E	SM	N
Sulfide	376.2	EPA	N
Total Organic Carbon	415.1	EPA	N
Total Organic Carbon	9060	EPA	S
Total Organic Carbon	TC-3991-04	PSEP	S
Turbidity	180.1	EPA	N
Turbidity	2130 B	SM	N
CHEM II (TRACE METALS)			
parameter name	method	reference	matrix *
Aluminum	200.7	EPA	N
Aluminum	6010	EPA	S
Antimony	200.7	EPA	N
Antimony	6010	EPA	S
Arsenic	200.7	EPA	N
Arsenic	6010	EPA	S
Barium	200.7	EPA	N
Barium	6010	EPA	S
Beryllium	200.7	EPA	N
Beryllium	6010	EPA	S
Cadmium	200.7	EPA	N
Cadmium	6010	EPA	S
Calcium	200.7	EPA	N
Calcium	6010	EPA	S
Chromium	200.7	EPA	N
Chromium	6010	EPA	S
Cobalt	200.7	EPA	N
Cobalt	6010	EPA	S
Copper	200.7	EPA	N
Copper	6010	EPA	S
Hardness, Total (as CaCO3)	200.7	EPA	N
Hardness, Total (as CaCO3)	6010	EPA	S
Iron	200.7	EPA	N
Iron	6010	EPA	S
Lead	200.7	EPA	N
Lead	6010	EPA	S
Magnesium	200.7	EPA	N
Magnesium	6010	EPA	S
Manganese	200.7	EPA	N
Manganese	6010	EPA	S

FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1

Mercury	245.1	EPA	N
Mercury	245.2	EPA	N
Mercury	7470	EPA	S
Molybdenum	200.7	EPA	N
Molybdenum	6010	EPA	S
Nickel	200.7	EPA	N
Nickel	6010	EPA	S
Potassium	200.7	EPA	N
Potassium	6010	EPA	S
Selenium	200.7	EPA	N
	6010	EPA	S
Silica	200.7	EPA	N
Silver	200.7	EPA	N
Silver	6010	EPA	S
Sodium	200.7	EPA	N
Sodium	6010	EPA	S
Strontium	200.7	EPA	N
Strontium	6010	EPA	S
Thallium	200.7	EPA	N
Thallium	6010	EPA	S
Tin	200.7	EPA	N
Titanium	200.7	EPA	N
Vanadium	200.7	EPA	N
Vanadium	6010	EPA	S
Zinc	200.7	EPA	N
Zinc	6010	EPA	S
MICROBIOLOGY			
parameter name	method	reference	matrix *
E. coli	600/4-91/016	EPA	N
Fecal Coliforms	9221 E	SM	N
Fecal Strep/Enterococci	9230 C	SM	N
Total Coliforms (Endo type)	9222 B(6b)	SM 18	N
ORGANICS I (GC)			
parameter name	method	reference	matrix *
Chlorinated Herbicides	615	EPA	N
Chlorinated Herbicides	8151	EPA	S
Organochlorine Pesticides	608	EPA	N
Organochlorine Pesticides	8081	EPA	S
Polychlorinated Biphenyls	608	EPA	N
Polychlorinated Biphenyls	8082	EPA	S
Total Pet Hydrocarbons - Diesel	NWTPH-Dx	WDOE	S
Total Pet Hydrocarbons - Gasoline	NWTPH-Gx	WDOE	S
ORGANICS II (GC-MS)			
parameter name	method	reference	matrix *
BNA Extr (Semivolatile) Organics	625	EPA	N
BNA Extr (Semivolatile) Organics	8270	EPA	S
Volatile Organic Compounds	624	EPA	N

FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1

Volatile Organic Compounds	8260	EPA	S
* Matrix key: D = drinking water; N = non-potable water; S = solid/sediment; A = air			

APPENDIX D--RESPONSE TO COMMENTS

This response to comments (RTC) is an appendix to the fact sheet for the above referenced National Pollutant Discharge Elimination System (NPDES) permit. The RTC summarizes comments received during the 30-day public notice and comment period on the draft permit, and provides the Department response. All changes to the draft permit are noted below. The Department has determined to issue this permit as revised.

Comments were received from Citizens for a Healthy Bay, City of Tacoma, and Lincoln Loehr with Heller Ehrman.

Comments from Citizens for a Healthy Bay:

1. CHB Comment:

Upgrade We support the City of Tacoma's effort to upgrade the current facility.

Response:

Comment noted.

2. CHB Comment:

Mixing zone A mixing zone, which allows discharge of pollutants that exceed the state water quality standards into Commencement Bay, is not in the spirit of the Clean Water Act. The objective of this act is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." The routine authorization of mixing zones is counterproductive to meeting this objective. It is clearly stated in section 1251 of the CWA that, "it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited," and that "it is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985." The Department of Ecology's failure to phase out these mixing zones or even to include sunset language, which will encourage movement towards the elimination of these zones does nothing to achieve the goals of the CWA and is in direct violation of the spirit of the act. This wholesale authorization of mixing zones violates water quality standards determined and implemented by the state of Washington.

Response:

The mixing zone for the City of Tacoma's wastewater treatment facility discharge was established in accordance with, and authorized under, WAC 173-201A-100. The permit process is not the forum to address your concerns which would be better served during the update to WAC 173-201A. No change to permit.

Comments from the City of Tacoma:

1. City of Tacoma Comment:

We would like this permit to include a process for establishing alternate effluent limits to allow us to test the new PWWT process.

Response:

Effluent from the peak wet weather treatment (PWWT) system that is not a result of a peak wet weather flow event such as testing or routine exercising of the unit will need to go back to the headworks of the plant. Testing of the PWWT process effluent is only required when flow is split and bypasses the secondary treatment process. There can never be a relaxation in the final effluent limits for temporary testing of the PWWT system. No change to permit.

Draft Permit

S1. Discharge limits

2. City of Tacoma Comment:

We are concerned (as we have communicated to you) about the water quality based fecal coliform limit. We believe there is ample data to indicate that our discharge has little impact on the fecal coliform readings at Ecology's monitoring station CMB003. We would like to propose (as you have suggested we do in the fact sheet) a water quality study to determine if, in fact, a water quality based Fecal coliform limit is warranted. We would further request that the current fecal coliform limits remain in effect until the completion of the water quality study.

Response:

As stated in the fact sheet the City has the opportunity to do a receiving water study to show that there is assimilative capacity in the vicinity of the outfall. If the study shows no potential to contribute to a water quality violation for fecal coliform the technology limits for Class B marine water will be reinstated in the City of Tacoma's NPDES permit. The current fecal coliform limits will remain in effect until the results of the study have been completed. No change to permit.

3. City of Tacoma Comment:

Attached are comments from Lincoln Loehr regarding the reasonable potential analysis for copper. If only dissolved copper is used in the analysis there is no reasonable potential to exceed water quality standards. If there is no reasonable potential to exceed limits there is no basis for a limit. Further, there is no basis for sampling for copper at a frequency greater than for any other metal. We request that the copper limit be removed from the permit and the sampling frequency for copper be reduced to quarterly.

The proposed copper limit has been incorrectly calculated. Ecology has apparently used a background ambient copper level based on total recoverable copper measurements, which is contrary to the dissolved metals water quality standards. If dissolved copper data is used the reasonable potential analysis shows no reasonable potential to pollute. Since there is no reasonable potential to pollute we ask that ecology remove the copper limit and reduce the sampling frequency for copper to once per quarter.

Response:

Ecology agrees that the incorrect background ambient data were used to evaluate whether or not there was a reasonable potential for Tacoma's effluent to violate the copper standard. The proper ambient dissolved copper data were used and the reasonable potential analysis rerun. The analysis showed no reasonable potential for the effluent to violate the water quality standard for copper. The copper limit will be removed from the permit and monitoring reduced to once per quarter.

4. City of Tacoma Comment:

We need some flexibility in the chlorine limit. We are improving our disinfection control system as part of the upgrade. We request that the limit not be lowered or at least the new limit not be enforced until after the upgrade.

Response:

The proposed limit was based on the discharge having a reasonable potential to violate the water quality standard for chlorine. The proposed chlorine limit is water quality based and there can be no relaxation in final effluent limits. However, the Department always has the ability to apply its' enforcement discretion based on the seriousness of the violation.

5. City of Tacoma Comment:

Footnote d on page 8: calendar day should be changed to sampling day.

Response:

The footnote will be changed to sampling day.

S6. Pretreatment

6. City of Tacoma Comment:

S.6.B We suggest replacing the word sludge with the word Biosolids in the opening paragraph and in paragraph 3. S.6.D paragraph 1 replace the word sludge with Biosolids.

Response:

The permit will be changed to read biosolids in place of sludge.

7. City of Tacoma Comment:

S.10.A.5 We are still concerned that the language here precludes flow blending. We recommend a change to: All water collected in the collection system must be conveyed to the treatment plant and receive secondary treatment up to flows of 60 MGD. When flows to the plant exceed 60 MGD all waters must be conveyed to the plant and receive a minimum of primary treatment and final effluent must meet secondary standards.

Response:

It should be the goal of the City of Tacoma to implement a collection system rehabilitation and replacement program that will significantly reduce the number and severity of peak wet weather flows. The ultimate goal would be to reduce peak flows to the point that would minimize and potentially eliminate the need for flow blending. No change to permit.

8. City of Tacoma Comment:

G18. We still contend that some conditions of this permit are rooted in state law not the federal Clean Water Act. Not all permit noncompliance constitutes a violation of the Clean Water Act but may violate state law only.

Response:

I have brought this issue up with the Department's permit writer's workgroup as a possible general condition language change. Any language changes to the general conditions or permit boilerplate will be reflected in the next permit issuance. No change to permit.

Fact Sheet

9. City of Tacoma Comment:

Page 7. Last paragraph. Change to: The proposed upgrades would result in the influent screens, influent pump station, and grit tanks being upgraded to a minimum peak hourly capacity of 150 mgd, and a new peak wet weather flow process installed to treat wet weather related peak flows in excess of approximately 75 mgd. The primary settling tanks and biological treatment process would remain at their current hydraulic capacity of approximately 88 mgd.

Page 8. 8th paragraph second sentence. Change to: Tacoma anticipates a considerable increase in the final project quality as well as possible cost and time savings using this alternate procurement procedure.

Response:

The fact sheet language will be changed per Tacoma's comments above.

10. City of Tacoma Comment:

Page 11 Effluent Loadings Before Upgrade. BOD and TSS monthly mass loadings are incorrect. They should both be: 9508 lbs/day.

Response:

Both the monthly average loadings for BOD₅ and TSS will be changed from 9,058 to 9,508 lbs/day.

11. City of Tacoma Comment:

Page 16. Copper Limit: See Lincoln Loehr's comments on copper reasonable potential analysis.

*FACT SHEET FOR NPDES PERMIT WA0037087
CITY OF TACOMA
CENTRAL WASTEWATER TREATMENT PLANT #1*

Page 19 Monitoring Requirements. If the copper limit is removed from the permit we see no reason to monitor for copper more frequently than we monitor for other metals. We suggest quarterly monitoring for copper.

Response:

The Department agrees that the incorrect background ambient data were used to evaluate whether or not there was a reasonable potential for Tacoma's effluent to violate the copper standard. The copper limit will be removed from the permit and monitoring reduced to once per quarter. The fact sheet will be changed to reflect these changes to the permit.

12. City of Tacoma Comment:

Page 20 and 21 Pretreatment. There is no provision in the permit that requires signed User Survey Forms. We renew our objection to this requirement in the fact sheet. We concur with the new wording in the permit that requires an industrial user survey be conducted and reported to the department every five years. We object to the prescriptive manner in which we are apparently being required to do this survey that we find in the fact sheet. We suggest that it is the City's responsibility to compile and maintain the Industrial User Survey and minimize our liability from business that might choose to violate or ignore our pretreatment ordinance. The manner in which that pretreatment ordinance is enforced, particularly in respect to how it effects City liability rather than how it prevents discharges to state waters, is a City concern and should not be dictated by the Department. We recommend that the last 2 paragraphs of page 20 and the first 2 paragraphs of page 21 be deleted.

Response:

The last three paragraphs under pretreatment will be removed from the fact sheet.